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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



A SCIENCE SERVICE PUBLICATION



(Left to right) Dr. John Bardeen\*, Dr. William Shockley\* and Dr. Walter H. Brattain, shown at Bell Telephone Laboratories in 1948 with apparatus used in the early investigations which led to the invention of the transistor.

## *Bell Telephone Laboratories Salutes Three New Nobel Prize Winners*

**Drs. John Bardeen, Walter H. Brattain and William Shockley  
are honored for accomplishments at the Laboratories**

The 1956 Nobel Prize in Physics has been awarded to the three inventors of the transistor, for "investigations on semiconductors and the discovery of the transistor effect."

They made their revolutionary contribution to electronics while working at Bell Telephone Laboratories in Murray Hill, N. J. Discovery of the transistor was announced in 1948. Bell Laboratories is proud to have been able to provide the environment for this great achievement.

This is the second Nobel Prize awarded to Laboratories scientists. In 1937 Dr. C. J. Davisson shared a Nobel Prize for his discovery of electron diffraction.

Such achievements reflect honor on all the scientists and engineers who work at Bell Telephone Laboratories. These men, doing research and development in a wide variety of fields, are contributing every day to the improvement of communications in America.

\*Dr. Bardeen is now with the University of Illinois, and Dr. Shockley is with the Shockley Semiconductor Laboratory of Beckman Instruments, Inc., Calif.



**BELL TELEPHONE LABORATORIES**

**WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT**

## BIOCHEMISTRY

# Origin of Photosynthesis

Photosynthesis may have started on very primitive earth, much earlier than has ever before been suggested, American Association for the Advancement of Science is told.

► A NEW THEORY of the origin of life on earth supposes that the ability to use the sunshine's energy arose almost in the beginning.

This speculation was proposed by Dr. Sam Granick, Rockefeller Institute for Medical Research plant physiologist, in a conference on spontaneous generation held in New York by the New York Academy of Sciences and the American Association for the Advancement of Science.

It means that photosynthesis could have happened earlier in the rise of life on our globe than anyone has yet dared to suggest.

In the past the general ideas were that only after life had developed to a rather complex state did photosynthesis occur. Photosynthesis is the mechanism for capturing the sun's energy by building up chemical compounds and it is the prime way in which energy is supplied to earth.

Dr. Granick supposes in his guess as to life's beginnings that there was a primordial mechanism which started off life by having some kind of energy supply that would act upon a mineral as a primitive energy unit. This would be a mineral that would operate in an oxygenless atmosphere with water, and with sunlight as the energy input.

A dark mineral, like magnetite, a form of iron ore, would absorb sunlight and have the ability to decompose water. It would be a photocatalyst and would develop organic materials. Life would begin in this high concentration of materials, through use of the sun's energy.

Dr. Granick pointed out that many of the enzymes of the body today are known to have metal atoms as the focal point of their activities and he compares them with inorganic metal ions and finds they have similar properties. The metal atoms have the capacity of concentrating around themselves some material, bringing about reactions and forming protoplasm. This kind of reaction is being studied in laboratories.

Pure magnetite, which he believes could have been the energy unit, has properties related to the solar batteries that have been invented recently, Dr. Granick explained.

Lightning's electric discharges could have synthesized organic compounds out of simple materials in the oceans early in the earth's history to give ingredients for living organisms, Dr. Stanley L. Miller, biochemist of Columbia University's College of Physicians and Surgeons, told the conference on spontaneous generation.

Dr. Miller sparked mixtures of gases for a week and made nine amino acids, of which glycine, alanine, aspartic and glutamic acids occur in proteins. Glycolic,

lactic, formic, acetic and propionic acids were also identified. (See SNL, July 2, 1955, p. 8).

Such compounds were formed when the earth was young, he believes. They were carried down by the rains and reacted in the ocean to give amino acids and other complex compounds.

Although synthesis of amino acids is not the synthesis of life, Dr. Miller suggested that it is a step toward understanding how living matter may have arisen on the earth.

He said one of the most fundamental problems of biology is posed by the question of how life arose on earth. Although the theory of evolution offers an explanation for the development of complex multicelled living organisms from single-celled organisms, Dr. Miller noted, it does not explain the development of the first organism.

His experiments were designed to test the theory that a complex mixture of organic compounds can be synthesized by electric discharges, which are similar to lightning, in a mixture of reduced gases. The idea that organic compounds might be formed if the primitive earth had a re-

ducing atmosphere of methane, ammonia, water and hydrogen instead of the present oxidizing atmosphere of carbon dioxide, nitrogen, oxygen and water has been suggested by A. I. Oparin and Nobelist Harold C. Urey.

Experiments reported by Dr. Philip H. Abelson of the Carnegie Institution of Washington also demonstrated that lightning could have produced from atmospheric gases materials out of which life might have arisen. (See SNL, Nov. 17, 1956, p. 308).

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## VIROLOGY

## Virus Causes Disease In Both Plant and Animal

► THE FIRST KNOWN CASE of a virus causing disease both in a plant and an animal was reported to the American Association for the Advancement of Science meeting in New York by Dr. Karl Maramorosch of the Rockefeller Institute for Medical Research, New York.

The virus causing aster yellows is transmitted to leafhopper insects that feed on the plant. It multiplies in the infected insects which, however, live as long and breed as freely as non-infected individuals.

This past year, experiments by Mrs. Virginia C. Littau in collaboration with Dr. Maramorosch showed changes in the fat cells of insects that had acquired virus by feeding on diseased plants. The plant virus causes a comparatively mild insect disease.

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**BULLET-NOSED CANBERRA**—An Air Force B-57 Canberra jet bomber is shown here after being modified by Temco Aircraft Corporation, Dallas, Texas, as a flying test bed for Bomarc missile guidance systems. Attaching the 17-foot nose necessitated major weight and stress design changes in the bomber.

## ASTRONOMY

# 1957 Astronomical Events

► A MAN-MADE EARTH SATELLITE, four eclipses and a passage of the planet Mercury across the sun's face highlight astronomical events for 1957.

The first earth satellite, however, could have a delayed launching and might not actually start circling the earth until early in 1958. If that happens, the 1957 heavenly show will be dominated by the two solar eclipses, the two lunar eclipses and the transit of Mercury.

A crossing of the sun's surface by Mercury, known as a transit, is a much rarer occurrence than an eclipse. Only 13 or 14 times a century can that planet be seen as a black dot against the sun's fiery yellow, as will happen on May 5, 1957.

The event will be visible generally from North America except in the extreme east, starting at 6:56 p.m. EST.

The year's first eclipse comes on April 29 and will be visible as a partial solar eclipse about sunset in the northwestern part of North America. Although the moon will be seen to come in front of the sun in the Arctic regions north of Europe, it will not completely hide it, as this is an annular eclipse.

On May 13 there will be a total eclipse of the moon, visible generally in Asia, Africa, Europe, Australia and Antarctica. Before it is over, the moon will rise along the eastern coast of North America, so people in this region will see the concluding phases.

The next eclipse is of the sun on Oct. 23, and is a total one that few people will see.

The path of totality is confined to the Antarctic, although a partial eclipse will be visible in South Africa.

The last eclipse for 1957 is another total eclipse of the moon, on Nov. 7. This time the beginning will be visible generally over North America, except for the eastern part, the region which saw the concluding phases of the May total lunar eclipse.

Official beginnings of the 1957 seasons have been computed at the Naval Observatory's Nautical Almanac Office. Spring starts, according to the astronomers, at 4:17 p.m. EST on March 20; summer begins at 11:21 a.m. EST on June 21; fall starts on Sept. 23 at 2:27 a.m. EST, and winter begins on Dec. 21 at 9:49 p.m.

The earth's two closest planetary neighbors, Venus and Mars, come very close together low in the western sky just after sunset on July 11. By that time, the red planet, which made a "close" approach to the earth last September, will have faded in brilliance until it is only second magnitude.

Most reliable of all meteor showers, the Perseids in August, will reach a maximum on the night of Aug. 12. At that time, it is expected that a single observer would spot about 50 "shooting stars" an hour, compared to the seven seen on the average by an observer when there is no shower.

Twelve other meteor showers with observing rates predicted at from 12 to 40 per hour are scheduled for 1957, from the Aquarids on May 4 to the Ursids on Dec. 22.

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started by Dr. Joseph G. Hamilton of the University of California with radiiodine.

Radioisotopes have also proved useful in treating some thyroid cancers, some skin cancers, and in palliation of cancers of the chest, uterus, prostate and abdomen.

The 1936 treatment was preceded by studies on animals with leukemia by Dr. Lawrence, and Drs. Kenneth Scott and Lawrence Tuttle. In addition, Dr. Hamilton, now director of Crocker Laboratory, Berkeley, and Dr. Robert Stone of the University's School of Medicine in San Francisco, had studied radiosodium uptake in patients with leukemia and allied diseases.

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## MEDICINE

# Medical Gift to World

► ATOMIC MEDICINE was born 20 years ago.

On Christmas Eve, 1936, a 28-year-old woman, victim of chronic leukemia, was given a dose of radioactive phosphorus 32 by Dr. John Lawrence, director of the Donner Laboratory at the University of California, Berkeley.

This was the first time in history a radioisotope was given for the treatment of a human disease.

That was the infancy of atom-smashing and, in all the world, only the 37-inch cyclotron operated on the Berkeley campus could make enough isotopes for the treatment. It was for the invention and development of this cyclotron, and partially for its application to medicine, that Dr. Ernest O. Lawrence, brother of John, received the Nobel Prize in 1939.

Radiophosphorus was not a cure then, nor is it now. However, since 20 years ago thousands of patients have been treated by this method, which has become a standard treatment. With it, the lives of patients

have been extended and made more comfortable.

Today, atomic piles operated by the Atomic Energy Commission dwarf the puny output of the 37-inch and later the 60-inch Berkeley cyclotrons, which in the pre-World War II period shipped isotopes on a small scale to scientists in many nations.

The AEC now makes thousands of shipments of isotopes each year to hundreds of groups of physicians all over the world.

"Isotopes have become an important addition to the medical tool kit, especially in relieving pain and providing comfort and life extension in certain types of cancer," Dr. John Lawrence said, in looking over the last 20 years.

He began treating polycythemia vera, a disease marked by an increase of red blood corpuscles, in 1939 and this became the first disease to be clearly controlled by isotopes. The treatment of Graves' disease, a disorder marked by an enlarged pulsating thyroid gland and other symptoms, was



## PHYSICS

# Reaction Releases Energy

Discover new kind of nuclear reaction that brings nuclear particles sufficiently close to cause fusion. The negative mu meson that does this emerges unscathed with the excess energy.

▶ A NEW KIND of nuclear reaction that yields more energy than is put into it was reported for the first time to the American Physical Society meeting here by Dr. L. W. Alvarez of the University of California, Berkeley.

Only 15 examples of "catalyzed nuclear reactions" have been discovered so far, he said, the first one less than a month ago. The two types of nuclear reactions now known are those occurring when atomic particles are hurled at other atoms, seen in giant accelerators and in atomic bombs, and the thermonuclear reactions of which fusion of atoms in hydrogen bombs and in stars are an example.

The newly-found nuclear reactions somewhat resemble fusion but occur at low temperatures instead of the million degrees or so needed to make H-bombs go.

A negative mu meson is the key to the discovery. As a catalyst, it takes part in the reaction but is not affected, itself. Its role is to help along a reaction that releases 5,400,000 electron volts of energy in a new way.

However, the lifetime of a mu meson is so short that the reactions it catalyzes are not very apt to happen. Scientists are sure to start hunting for other sub-nuclear particles with similar properties but longer lifetimes.

Dr. Alvarez and 11 associates found the new kind of thermonuclear-like reactions using the "bubble chamber" attached to the bevatron, the University of California's giant atom smasher located at the Radiation Laboratory. The bubble chamber, ten inches long, is filled with liquid hydrogen. Charged particles produced in the accelerator leave paths of bubbles when they pass through the liquid.

For several years, physicists have been studying what are called mesic atoms. The simplest of these is a hydrogen atom in which the electron circling the nuclear proton has been replaced by a negative mu meson. Since the mu meson is 210 times heavier than the electron, it circles the nucleus at a distance only 1/210th that of the electron, giving an electrically complete atom with a decidedly short life.

In two-millionths of a second, a mu meson turns into an electron and energy. Instead of teaming up with a proton, however, the Berkeley scientists discovered that the mu meson would much prefer to pair briefly with a deuteron, the nucleus of heavy hydrogen. In natural hydrogen, one atomic nucleus in 5,000 has a neutron stuck to its proton, and is called a deuteron.

When a mu meson latches onto a deu-

teron, the resulting short-lived particle ties up with a proton to form a mu mesic molecule. The mu meson has pulled together the deuteron and the proton, binding them very close to each other because the mu meson is so close to the nucleus.

Since they are held tightly together, the deuteron and the proton soon fuse to form helium three. The nuclear mass of helium three is less than the combined mass of the proton and the deuteron.

This mass is transformed into energy. The mu meson carries the energy—5,400,000 electron volts—away when it is ejected at the time of fusion.

The Berkeley scientists checked their theory by enriching the ordinary hydrogen in the bubble chamber with heavy hydrogen. They found an increase in the number of reactions, confirming their discovery of "catalyzed nuclear reactions."

They foresee no use for the mu meson in power reactors or bombs, but point out it would be "interesting" to find a much longer-lived particle like it. The Russian physicist Alikhanian has reported evidence of such a particle.

The possibility of catalyzed nuclear reactions was predicted theoretically by another Russian, Ya. B. Zel'dovich.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows a catalyzed nuclear reaction recorded in a hydrogen bubble chamber. Beginning at upper right and streaking almost all the way across the picture in a gentle downward curve to the left is a mu meson. At the end of this track a mesic atom has been formed, and the mesic atom drifts slightly to the left, leaving a gap in the track. On the left side of the gap the mesic atom has fused a deuteron and proton into helium, with the ejection of the mu meson, which makes a short track upward and to the left. At the end of this short track, the meson stops and decays into an electron which starts toward the right and curves upward.

The scientists who participated in the research, besides Dr. Alvarez, were Drs. Hugh Bradner, Frank S. Crawford Jr., John A. Crawford, Paul Falk-Vairant, Myron L. Good, J. Don Gow, Arthur H. Rosenfeld, Frank Solmitz, M. Lynn Stevenson, Harold K. Ticho and Robert D. Tripp.

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Arteriosclerosis is the chief cause of death in the U. S.

Corn earworm damage is quite variable but averages about \$50,000,000 a year.



**MU MESON'S PATH**—The photograph shows a sequence of two catalyzed nuclear reactions—two links in a chain-like reaction found in a hydrogen bubble chamber. At the center of the photograph, a mu meson generated by the bevatron enters the picture almost vertically. At the first bend in the track, a mesic atom has been formed, a deuteron and proton have been fused into helium, and the mu meson has been ejected on a track that zigs downward and sharply to the horizontal line. At that sharp angle in the track, another catalyzed reaction has taken place, and the meson is ejected horizontally across the picture. There the meson has come to rest, and decayed into an electron which makes a sweeping curve up and back out of the picture, crossing the entering track.

## MEDICINE

## Heart Disease Fight Extends Into Canada

▶ THE FIGHT against heart disease is being extended by formation of the National Heart Foundation of Canada.

The new foundation will eventually be a federation of provincial heart organizations stretching from coast to coast. As such, it will attempt to coordinate research in prevention and relief of heart disease and correlate the efforts of groups and individuals interested in reducing this disease.

In addition the foundation will aid in the development of measures and facilities for the diagnosis and treatment of heart disease and the rehabilitation of heart disease victims.

To promote its work, the foundation will foster fund raising campaigns in cooperation with its provincial groups.

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## MEDICINE

# Suggest Cancer Preventive

A large decrease in incidence of most cancer forms is foreseen if most people reduced their caloric intake sufficiently to make their weight slightly below accepted optimum.

► **CANCER** could be drastically reduced if people were not such gluttons and if increasing income and food supply did not overfeed the average person.

This way to reduce the second most common cause of death is advocated in an authoritative publication of the Nutrition Foundation by Dr. Harold P. Rusch, University of Wisconsin professor of oncology, which is the study of tumor growth, and editor of the journal, *Cancer Research*.

The difficult part about applying this preventive measure is that people would have to be hungry most of the time, or as Dr. Rusch puts it:

"In the opinion of the writer, there is no doubt that a drastic reduction in the incidence of almost all forms of cancer would be achieved if the caloric intake were reduced sufficiently to decrease the weight of all people to slightly below the accepted optimum."

Unfortunately, the kind of diet Dr. Rusch prescribes is usually found only in the very poorest regions of the world, or for a short time in other areas right after a war.

The desire to eat is one of the first to be satisfied when more money and more food are at hand, Dr. Rusch reports, and the average person will not give up the joy of eating just to reduce his chances of getting a tumor, especially since it might not happen even if he becomes a glutton.

This is no new idea. A decade ago scientists were optimistic about stopping cancer with low-calory diets. In 1946, Dr. Rusch and a colleague, Dr. C. A. Baumann, reviewed the problem of diet and cancer in *Nutrition Reviews* (April, 1946). They believed then it was only a matter of time before laboratory results could be applied to humans.

A special panel on nutrition was set up by the National Research Council's Committee on Growth to help in financing studies along this line.

Times have changed, Dr. Rusch reports, and two years ago the panel was combined with another one on metabolism. Requests had dropped to the point where the undivided attention of a single panel was not needed.

The big drawback has been that laboratory results cannot always be duplicated in humans. There are not enough people willing to undergo the rigorous dieting to prove scientifically its value.

Other ways to get the same results have been tried over the last ten years, including vigorous exercise, low temperature, and giving drugs such as sodium fluoride and dinitrophenol, a dye-making compound.

They all worked in animals, but it was

a different story in humans. Most people are not inclined to undergo that much exercise or temperature reduction, Dr. Rusch reported in *Nutrition Reviews* (Dec., 1956). The drugs proved too toxic for safe use in humans.

There still have not been any practical results in controlling cancer by dieting, but Dr. Rusch expects an increased interest in the problems of tumor nutrition in the next few years.

Now the emphasis has shifted from the growth of the whole tumor to the growth of the individual tumor cells.

This is of great importance because tumor cells may be found to require substances not needed for normal ones, Dr. Rusch believes. If so, the random selection now used to pick anti-cancer drugs can be replaced by a more direct approach.

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## MEDICINE

# Properdin Slows Cancer

► **CANCER GROWTH** may be controlled by properdin, a blood protein discovered two years ago, Dr. Peter A. Herbut and William H. Kraemer, Jefferson Medical College and Hospital, Philadelphia, report.

Properdin is known to take part in the destruction of bacteria and certain red cells, as well as in the neutralization of viruses. It is normally present in the blood serum of humans and many animals, but can be destroyed by irradiation.

Human cancer growths were transplanted in experimental rats to test the effect of properdin on the rats' natural immunity, the scientists report in *Cancer Research* (Dec., 1956). They found that when the amount of blood properdin was low, the cancers were able to take hold and grow in the animals.

The animals were divided into four groups. One group was left untreated, another group was given a heavy dose of radiation, and the other two groups received injections of zymosan, a chemical taken from yeast cell walls.

Zymosan combines very rapidly with properdin and, when injected into the body, quickly lowers the level of properdin in the blood.

After the cancers were transplanted, the number of "takes" were recorded, each take representing a breakdown of the rats' natural resistance permitting the cancer to grow in its new host.

Over half of the cancers transplanted in

## RADIO

Saturday, January 12, 1:45-2:00 p.m., EST  
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Charles Williams, director of Industrial Hygiene Services, Liberty Mutual Insurance Company, Boston, will discuss "The Menace of Noise."

## BIOCHEMISTRY

## Chemical for Bleaching Blondes Fights Germs

► **HYDROGEN PEROXIDE**, familiar as a bleach for synthetic blondes and for other purposes, promises to become a germ-fighter that can step in when the antibiotics fail.

Dr. Herbert M. Cobe of Temple University, Philadelphia, reported to the American Association for the Advancement of Science meeting in New York that it has been possible to stabilize non-aqueous forms of hydrogen peroxide, and that his researches confirm its effectiveness as a bactericide.

Older medications should be reappraised, in Dr. Cobe's opinion, because of the sensitivity of patients to antibiotics and resistance of bacterial strains to the newer drugs.

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## DENTISTRY

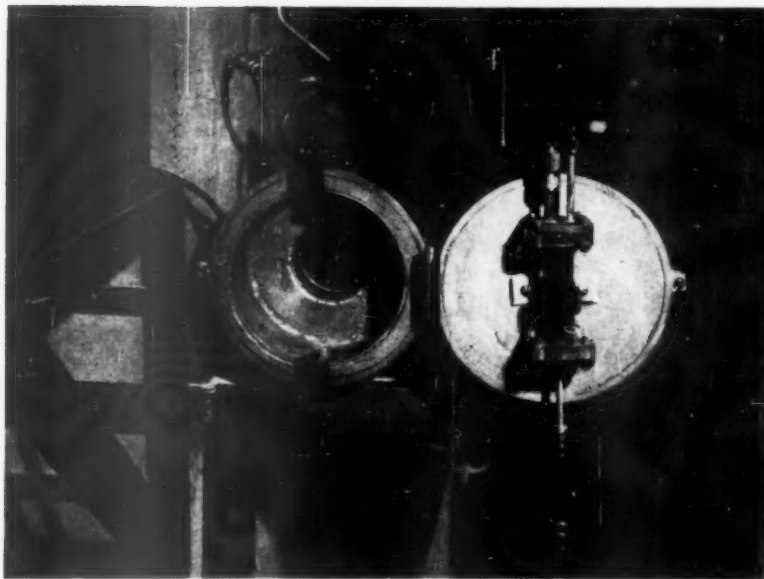
## Dizzy? Uneven Bite May Be to Blame

► **UNEVEN** dental bite was blamed for vertigo, with periodic headaches, equilibrium loss, dizziness, nausea and blackouts, by a physician-dentist team of Philadelphia, Dr. Herbert T. Kelly and Dr. David J. Goodfriend, at the American Association for the Advancement of Science meeting in New York.

A decade of research showed 96% of the sufferers from vertigo examined had teeth that do not properly support the lower or upper jaw, they reported.

This affects the area of the ear, disturbing the semicircular canals that control equilibrium.

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**REACTOR MONITOR**—This photograph shows the instrument attached to the Materials Testing Reactor of the Atomic Energy Commission in Idaho that gives an early indication of any break in fuel element cladding. It does this by responding to gamma radiation from fission product iodine in the reactor's cooling water, a sample of which flows continuously through the detector unit of the monitor. The instrument was developed by Phillips Petroleum Company, which operates the reactor for the AEC.

## GENERAL SCIENCE

## Food Losing Race

► **INDUSTRIALIZATION** promises to spread to areas of the world where people are hungry today and destined to remain hungry for a long time in the future, Dr. Harrison Brown, professor of geochemistry of the California Institute of Technology, warned the American Association for the Advancement of Science meeting in New York.

While the industrial production of the world's less advanced areas can be increased rapidly, the similar increase of food productivity is so difficult that hunger faces all the peoples of the world in the future.

Although, in principle, with world wide extension of the best conventional agriculture, we could feed several times the present world population, this would require the changing of attitudes and beliefs of a great many people.

This process, Dr. Brown fears, would take generations rather than years. It is difficult to increase food productivity at a rate faster than about two percent per year, while populations already hungry can increase at rates as high as three percent a year.

The hungry world menace stares civilization in the face despite the capability of increasing world-wide industrial produc-

tivity up to a thousand times greater than that of today. This could be accomplished, Dr. Brown said, by use of the almost limitless amounts of energy that could be extracted from the sun's rays and the uranium of rocks.

"We are today in the middle of a revolution," Dr. Williams said. "We are in the middle of a transition from one major level of culture to another—from one primarily agrarian to one primarily urban-industrial."

The closest parallel is the change from a culture of food gatherers to one of farmers some 7,000 years ago.

The hope for world peace is remote or even unattainable until the pressures from population growth are relieved, Dr. Fairfield Osborn, president of the Conservation Foundation, told the scientists. The pressures resulting from rapidly growing populations are a major cause for the great majority of conflicts between nations, he said.

The question as to whether productivity can continue to gain on population as it has in the past in the United States was raised by Earle L. Rauber, vice president and director of research, Federal Reserve Bank of Atlanta, Ga.

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## SURGERY

## Scars Filed Away With Sculpturing Tools

► **SCARRED FACES** are being filed smooth with the aid of sculptors' tools, it is reported in *Archives of Dermatology* (Dec., 1956).

Using the type of forged steel rasps that can be found in most sculpture supply houses, Dr. Douglas Torre, Cornell University Medical Center, New York, has developed a new technique for dermabrasion.

Dermabrasion, or skin planing, is a method for removing or improving the scars caused by acne, chickenpox, shingles and smallpox. The scarred areas are actually scraped away, or abraded. Sand paper and revolving wire brushes have both been used to do this, but the rasp technique is simpler, cheaper and easier to control, Dr. Torre reports.

The rasps are used in a crisscross and circular motion on the scarred skin which has been injected with a local anesthetic.

One advantage of the rasp method is that the skin is not "frozen" with an anesthetic as it is before wire brush treatment, Dr. Torre says. This allows the doctor to evaluate the scarred area during the operation.

Usually, both the wire brush and the rasp are used by Dr. Torre. Large areas are done with the wire brush, and the "finishing off" is done with the rasp.

Twenty-four patients got the rasp treatment, Dr. Torre reports, and the results varied from an estimated 20% to 75% improvement in appearance.

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## EDUCATION

## TV Show on Elements Stars Nobelist Seaborg

► **AN EFFORT** to present a picture of the true structure of the world and its surroundings will be made in a series of educational television programs featuring Dr. Glenn T. Seaborg, Nobel Laureate and co-discoverer of plutonium and other synthetic elements.

The television series, produced by San Francisco's station KQED, will be nationally distributed beginning this month by the Educational Television and Radio Center, Ann Arbor, Mich., through educational TV stations.

The title of the series of ten programs is "The Elements." It concerns the characteristics of the fundamental building blocks of the universe, the 101 elements, how they were discovered, how they are put together to shape the world of millions of substances known to man.

Dr. Seaborg is the discoverer of more of these fundamental building blocks than any other man in history. He participated in the discovery of eight elements, all synthetic, starting with plutonium.

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## GENERAL SCIENCE

**Another Smyth Report  
On Peaceful Fusion Urged**

By WATSON DAVIS

▶ WHAT THE SCIENTIFIC WORLD needs is another Smyth report. It may be difficult in these days of continuing, rigid secrecy in most matters, atomic, missile and aerodynamic, to remember back to the days just after V-J day and explosion of atomic bombs over Hiroshima and Nagasaki.

Dr. H. D. Smyth, Princeton professor and later to be a commissioner on the Atomic Energy Commission, had written a best-seller-to-be and the extraordinary story of what fission wrought was issued with commendable completeness and promptness under Government auspices.

There had been a blackout on nuclear research and applications from the middle of 1940 until the latter part of 1945.

Even during World War II, the discovery of the fission of uranium in Germany (1939) was published and made known to the whole world, whether because of the persistence of the habit or custom of freedom of scientific publication or whether because of the lack of realization by the Nazis as to what it could mean.

Since the Smyth report, there has been an effective embargo on telling about new atomic discoveries.

Most of what we know about the thermonuclear reaction that dangled the H-bomb over our heads has been leaked out in surmises and speculations, mainly by persons on the fringe of the atomic program or working outside the restrictions of the Atomic Energy Commission.

Concerning the application of fusion to peaceful power, the Russians have told more about the basic processes involved than the United States has.

Dr. Smyth should write another report. It is long overdue.

(Reprinted from *Chemistry*, Dec., 1956).

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## MEDICINE

**VA Using Giant Cobalt  
Machine Against Cancer**

▶ A RADIOACTIVE COBALT machine has been put into operation to treat patients with deep-seated cancers at the Veterans Administration research hospital in Chicago.

The machine weighs 16 tons and is housed in an underground room two stories high. It is controlled by pushbuttons on a control panel located in another room shielded with walls of concrete and earth two feet thick. The operator in the control room watches the action of the machine through a periscope.

In the treatment room, the patient is placed inside two metal rings that revolve in opposite directions. The inside ring contains the radioactive source and moves back and forth while being turned in a full circle around the patient by the larger,

outside ring. These two types of motion allow a maximum amount of radiation to be aimed at the cancerous tissue while protecting healthy tissue, the VA said.

The machine's radioactivity comes from two lead "pots" containing some ten slugs of cobalt. Each slug is about the size of a nickel and has been "cooked" in the government's atomic furnaces in Oak Ridge. The slugs give off the same amount of cancer-killing gamma rays as would a three million volt X-ray source, the VA said.

One of the safety features built into the machine is an automatic cutoff that operates even in the event of power failure. Thus the doctor using it never loses control of the apparatus.

The VA plans to decorate the room with ten large murals to make the patients feel a little more at ease in the presence of the large machine. The murals will feature pleasant scenes.

Science News Letter, January 5, 1957

## PUBLIC SAFETY

**Urge Auto Driving  
Courses Start in Grades**

▶ TEACHING STUDENTS how to drive automobiles should be started in the junior high school or the early high school grades, Drs. Virtus W. Suhr and A. R. Lauer of Iowa State College's driving research laboratory urged at the American Association for the Advancement of Science meeting in New York.

Based on the results of a five-year experimental study, they advocated moving classroom training down into the elementary and junior high school grades, even if behind-the-wheel training cannot be given legally so early.

In addition to preliminary study of driving, they suggested early use of simulated driving devices and instruction in larger groups.

"Development of attitudes is much more important than the training of skills," they reported.

Driver training, they urged, could be offered as a part of some scientific course, providing project material for physics and mathematics, for instance.

The effect of training seems to be more highly beneficial to women than men, the study showed.

Training seems, according to results of the survey, to cut women's accidents by about half, but reduces men's accidents at the earlier age by only about 25%. For men, the training effects seem to wear off after the age of 21 to 22.

Only a small percentage of pupils now have the opportunity of getting driver education, and the survey showed that even in Iowa, where more than 6,000,000 youngsters have been enrolled in driver education courses in the last decade, not more than five percent of the drivers on the roads have received such high school training.

Science News Letter, January 5, 1957

**IN SCIENCE**

## ZOOLOGY

**Insects Imitate Others  
To Avoid Capture**

▶ INSECTS advertise, sometimes with bright and gaudy colors, that they are not good to eat, Prof. Frank N. Young, Indiana University zoologist, told the Society for the Study of Evolution at its meeting in New York.

He reported that he tried to find out by experiment how successful insects were in avoiding capture by advertising by brilliant colors and markings that they produce ill-smelling and tasting fluids and gases when attacked by birds, mammals and reptiles.

However the insect switch is that some of them surreptitiously, mimic the appearance of distasteful ones even though they are not.

"It is like a dishonest business firm which surreptitiously adopts the trademark of a successful competitor in order to sell an inferior product," Dr. Young said, "except of course the object of the insect advertisers is not to sell a product."

Science News Letter, January 5, 1957

## BIOCHEMISTRY

**Blood Clot Chemical  
In Circulating Blood**

▶ ATOMIC MEDICINE has scored another "first" by proving that heparin, a powerful body chemical that dissolves blood clots, can be found in tiny amounts in normal circulating blood.

The discovery, made possible by using a radioactive "tracer," was announced to the American Association for the Advancement of Science meeting in New York in a report by Drs. Harold B. Eiber and Isidore Danishefsky of the New York Medical College.

This breakthrough now opens the way for more research in abnormal blood clotting, the dangerous situation found in certain types of heart trouble (coronary thrombosis), and radiation sickness from A-bomb explosions.

Heparin is the most powerful known anticoagulant of blood, and is given to dissolve blood clots in heart disease cases. Exactly how it stops blood clotting has not been found, mainly because of the difficulty in making heparin radioactive.

The scientists succeeded in doing this by injecting an animal with radioactive sulfur, one of the chemicals used by the body to manufacture heparin. The heparin made with the sulfur was then radioactive and the scientists were able to locate it in circulating blood.

Science News Letter, January 5, 1957



# CE FIELDS

## PSYCHIATRY

### Psychiatrist Asks Silent Patients to Make a Noise

► WHEN PATIENTS remain silent during psychoanalysis, asking them to "guess a noise" may help, Dr. W. Clifford M. Scott, Montreal, Can., told the American Psychoanalytic Association meeting in New York.

Patients may act as if they are defending themselves against making a noise they wish to make. The psychiatrist could remind the patient of the noise by making it himself, he said.

Both children and adults may use noise instead of speech for many reasons, Dr. Scott said. The "er's", the "uh's", and the "ah's" may show the patient's resentment at being asked to talk.

The noise they make, or hint at being afraid to make, will help them and psychiatrists understand the feelings hidden by the silence, he reported.

A child's baby talk may indicate a wish for the adult to learn the child's language, he said, or it may indicate the child's resentment at being asked to learn the mother's tongue.

Dr. Scott believes that greater use of noise may furnish a useful link between the wish to act or play, found in children, and the wish to speak, found in adults.

Science News Letter, January 5, 1957

## GENETICS

### Urge Studying How Heredity Affects Minds

► HEREDITY plays an important part in determining whether a man will be a Phi Beta Kappa or a moron, whether a dog will be a fierce, snarling police dog or a friendly tail-wagger, whether a rat will be bright at learning to go through mazes or dull.

However, scientists need to know a lot more about the pathways between the inherited genes and such differences in behavior. Research in this field is urged by Dr. John L. Fuller, psychologist of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me.

One pathway that should be explored, Dr. Fuller suggests, is the inheritance of variation in structure of the brain and nervous system. Not enough is known, he indicated, about differences in the brain and nervous system between an idiot and the winner of the \$64,000 question.

Some geneticists believe that all gene effects upon complicated processes of behavior will be found, upon close analysis, to depend upon enzymes.

It is known, for example, that one specific

form of mental deficiency is linked with an inherited enzymatic deficiency, a disorder in the metabolism of one of the amino acids, phenylalanine. The abnormal metabolic products seem to produce a toxic state in which the brain does not function properly.

We should search, Dr. Fuller says, for metabolic deficiencies in other forms of mental disorders, particularly when they occur running in particular families.

We should look for what causes differences in strengths of motivation, he indicated. So called "dull" rats, called that because they make lots of mistakes in a maze, are not imbeciles. In other tests they may even surpass the "bright" animals.

"In our psychological comparison of dog breeds at the Jackson Laboratory, we have found no one breed to be consistently superior on all tests," Dr. Fuller declared. Instead there are characteristic patterns of abilities that seem to be dependent upon heredity.

Another path suggested for gene action upon behavior is through the endocrine glands.

Dr. Fuller reports his findings in *Eugenics Quarterly* (Dec., 1956).

Science News Letter, January 5, 1957

## ANTHROPOLOGY

### Big Game Hunters Lived In West 1,000 Years Ago

► MORE THAN 500 YEARS before Columbus first saw America, people were living and hunting big game in Upper Hell's Canyon on the Snake River in what is now Oregon and Idaho.

The projectile points with which they felled their game and bones of deer and elk left from their dinners were found by Smithsonian scientists under the direction of Dr. Warren W. Caldwell and George L. Coale, in an attempt to rescue archaeological material before flooding of the area by the Brownlee and Hell's Canyon reservoirs.

Some of the findings were dated at over 1,000 years old.

These ancient Americans obtained their food by hunting wild animals and gathering the wild foods of forest and meadow. Fishing equipment was not found, but an abundance of fresh-water mussel shells in the kitchen middens, or dump heaps, indicate that these people did get some food from the water. Milling stones showed that they must have ground the seeds they gathered.

They apparently lived in rude houses, probably made of brush, on a saucer-shaped depression about 25 feet across and about one foot deep near the center.

When the first Europeans arrived in the area, it was inhabited by a band of Shoshoni Indians known as the "Mountain Sheep Eaters." This group also lived by hunting and gathering wild food. The Shoshonis were last known to visit the area regularly in the 1880's.

Their survivors now live mostly on reservations in Idaho and Oregon.

Science News Letter, January 5, 1957

## CRIMINOLOGY

### Manage Criminals' Lives Instead of Confinement

► CONFINEMENT to jail or any other kind of detention is harmful and actually operates against rehabilitation of criminals, Dr. Marcel Frym, director of criminological research, Hacker Foundation for Psychiatric Research, Beverly Hills, Calif., contended at the American Association for the Advancement of Science meeting in New York.

Instead, Dr. Frym suggested there should be complete management by private agencies of individuals who have endangered the community by anti-social acts of some seriousness. This would include necessary adjustment of the home and family situation, proper employment and psychotherapy.

Fears underlie every kind of delinquency, he explained, and they can be reduced by an adequate type of work holding some promise for the future.

"Methods other than punishment through incarceration can have a tremendously deterring effect on the tempted offender and can much more efficiently mobilize inhibitions against the commission of a crime," Dr. Frym said.

"To classify an offender, after clinical study and examination, as seriously disturbed and in need of treatment, and correctional psychotherapy itself, may be much more painful to the law-breaker than the traditional type of punishment.

"This kind of procedure, which compels him to face his hidden, repressed fears and to look at his misdeeds self-critically, is a shocking experience and makes it impossible for him to blame society or others for his antisocial activities."

Science News Letter, January 5, 1957

## MEDICINE

### Blood Pressure Reducing Drugs Tested Nationally

► FIVE OF THE NEWER, highly praised drugs for lowering blood pressure and controlling heart disease are now being studied in a nation-wide test by six Veterans Administration hospitals.

The drugs are reserpine, a tranquilizing drug; hydralazine, a powerful dilator of blood vessels; and three other synthetic compounds, pentolinum tartrate, chlorisondamine chloride and mecamylamine hydrochloride. These last three block nerve impulses going to the blood vessels.

Dr. Edward D. Freis of the VA Mount Alto Hospital, Washington, D. C., is co-ordinator of the two-year test program. He said the program's great value lies in the tremendous resources of the VA hospitals, with their large number of patients and opportunities for follow up studies.

Dr. Freis said present medical opinion differs on how effective the drugs really are. The VA study will settle the matter with scientifically proved facts.

Science News Letter, January 5, 1957

## GENERAL SCIENCE

# Science Forecast For 1957

**The year of the missiles predicted, with first launching of satellite. Anti-matter to be studied in giant accelerators. Russia will get biggest atom smasher into operation.**

By WATSON DAVIS

► THE YEAR 1957 promises to be the year of the missiles. Long enough in design and development to be about ready for major testing and perhaps going into production, the ICBM, or intercontinental ballistic missile, should be prominent in this new year, although the public may hear relatively little about the tests unless there are mishaps.

The first of the earth satellites to be launched by man's inventiveness will sail upward on a three-stage rocket. There will be great interest when the earth is first circled by a sphere full of mechanisms that will send back to earth by radio messages what is observed.

We must have confidence that the peaceful use of rockets and missiles will be the important events of 1957 space exploring, not the flinging in war of missiles with H-bomb warheads.

The far-flung study of the earth during the International Geophysical Year, or IGY, actually an 18-month period beginning July 1 next, will begin to produce results. There should be major additions to our knowledge of Antarctica from the numerous expeditions of several nations upon that great expanse of ice.

## Anti-Matter Studied

Discovery of the anti-proton in 1955 and the anti-neutron in 1956, through their manufacture in the University of California bevatron, will lead to the production by that great accelerator of stronger beams of anti-particles. The reactions of these particles with ordinary or positive matter, such as exists normally around us, will be intensively studied.

There will be further study and speculation as to the rather bizarre consequences of anti-matter and even a whole duplicate universe or at least galaxies that are composed of anti-matter.

These and other particles, correctly called "strange" by the physicists, will cause both experimental and theoretical exploration. In Russia a ten billion electron volt atom smasher to be the world's largest—contrasted with the six Bev of the University of California, present world's record holder—will go into operation.

We can therefore expect the Soviet physicists to take a temporary lead in exploration of matter's composition, since they will have an instrument more powerful than anywhere else in the world.

Meanwhile in the United States, plans

are afoot to build larger and larger accelerators, with a planned 25 Bev machine under construction at Brookhaven. The possibilities of using a couple of accelerators, each of 15 to 20 Bev, are being explored by Midwestern Universities Research Association.

The astronomical yardstick for measuring the universe in the space around us in which light takes less than a million years to travel will probably be further revised as a consequence of revisions in the luminosities of Cepheid and cluster type variable stars on which the distances are based.

As a consequence of the studies of radiation dangers and the scientific and public discussion of this problem that affects the present and future generations, the Atomic Energy Commission is expected to reduce the biological safe dose or tolerance level for radiation.

This will have an important effect on the H-bomb test situation and on laboratory shielding requirements. It will also mean

nuclear power wastes must be much more carefully controlled. Nuclear power development will be affected by this new requirement and the atomic power plants may be somewhat delayed and more costly.

The application of radioisotopes to industrial uses, as in food and drug sterilization and in speeding chemical reactions, such as petroleum cracking, will accelerate. A multi-curie fission product plant to separate large quantities of cesium 137, strontium 90 and other radioactive by-products of reactors is scheduled to begin operation in June.

## Search for Cancer Drugs

It is perhaps too early to expect a breakthrough in the intensive search for a chemotherapeutic agent for use on some kinds of cancer, but the intensive research effort now underway will continue through 1957, with trials of any drugs found promising.

Chronic diseases and aging will continue to receive emphasis in the U.S. Public Health Service research program. Medical research facilities will continue to be expanded. The national health survey will begin to produce results useful in planning the needs of the nation.



**ROCKETS AND MISSILES**—This British ramjet engine, named Thor, is symbolic of the rockets and missiles that will make more flights than ever in 1957, both experimentally for defense purposes and in preparation for launching of artificial satellites for the International Geophysical Year. The Thor pictured is much smaller than most missiles and is designed to propel at speeds of more than 1,000 miles per hour.

The successful attack on polio through the use of Salk vaccine will result in a continued decline in polio incidence.

Continued development and use of tranquilizing and euphoriant drugs will continue to bring hopeful progress to the treatment and control of mental disease. Some of the new drugs for use in mental disorders will be more effective and less complicated by side-effects.

Chemical studies of some forms of schizophrenia may give a basis for understanding that will result in a break-through in the treatment of this disease.

Treatment of human abnormalities will receive clinical and experimental attention through studies of the biochemical aspects of individuality and chemotherapeutic methods.

In research upon the hormones, particularly the pituitary, there should be progress in correlating chemical structure with biological activity.

Look to Russia and Asia for new discoveries of the remains of fossil men. Because of their geographical position, Soviet scientists have the best chance to discover and report new finds that could revise our ideas of the ancestry and area of origin of the human race.

Spurred by accidents during 1956, there will be in 1957 air traffic control at all altitudes, both on and off airways. The Civil Aeronautics Administration contemplates a much wider use of radar in air traffic control.

Due to the increased use of helicopters in ferrying passengers from outlying airfields to convenient locations in the middle of cities, safe standards will be put into effect for heliports in downtown areas.

The national science youth program of science clubs, science fairs and accelerated aid to science teachers will continue to bring results that promise to alleviate the shortage of scientists and engineers.

In more than 150 localities in the United States, science fairs will be held and the top science exhibits from these fairs will be shown at the National Science Fair in Los Angeles in May. Some 200,000 young scientists will participate in this nation-wide activity.

## Postmortem on 1956

The science forecast for 1956 made by Watson Davis, director of SCIENCE SERVICE, and issued a year ago was fulfilled in many instances.

The concern over the damage of atomic radiation to those now living and to be born in the future was justified, since there were extensive reports by scientists and debate on atomic bomb testing played a leading role in the presidential campaign.

The beginning of operation of the British 60,000-kilowatt atomic power plant was forecast. Testing of atomic weapons by the United States, Russia and Britain continued as foreseen.

The expectation of the continued exploration of subatomic particles was fulfilled by the discovery of the anti-neutrino.

The mass use of Salk vaccine for polio did result in a reduction of the incidence of the disease. The application of tranquilizing drugs to mental patients continued with gratifying results.

The application of the image converter to large telescopes to increase their power did not progress as fast as expected, but there were obtained more data about the depths of the universe as expected.

Science News Letter, January 5, 1957

## TECHNOLOGY

### Use Plastic Bags for Carrying Live Fish

► TRANSPORTING TROPICAL FISH in plastic bags, such as those in which refrigerated vegetables are kept, seems to be practical, according to Kenneth Norris and William McFarland, University of California at Los Angeles ichthyologists, and scientists at Marineland, a southern California aquarium.

The plastic bag technique was originally devised with air transport in mind. The heavy metal containers formerly used to ship live fish resulted in high air freight costs.

It was found that tropical fish could be kept safely for a limited time in a sealed plastic bag of water in which the air had been displaced by pure oxygen. When a chemical buffer is added to the water, the fish can remain in the bag for several days without harm.

The buffer helps maintain an acid-alkalinity balance in the water necessary for the fish. It also seems to act on the fish, slowing down their activity and conserving energy.

During transport the bag is placed in a protective cardboard carton.

Science News Letter, January 5, 1957

## PHYSIOLOGY

### Officer Sets Altitude Record While on Ground

► A HIGH ALTITUDE record of 198,770 feet has been reached by a man who never left the ground.

The Air Research and Development Command, Baltimore, Md., reported that Maj. Arnold I. Beck reached the nearly 38-mile altitude in an aero-medical test chamber at its Wright Air Development Center, Dayton, Ohio. Maj. Beck is a college professor, recalled to military service in January, 1954.

Maj. Beck's altitude record is the highest simulated height ever reached by man.

Science News Letter, January 5, 1957

## BIOCHEMISTRY

### Study Nature of Virus Infection Core

► FURTHER LIGHT has been shed on the nature of the infectious core of a virus.

Studies by Drs. William Ginoza and Amos Norman of the Atomic Energy Project at the University of California at Los Angeles indicate that the entire nucleic acid component of the tobacco mosaic virus is essential for infectivity.

Recent research has shown that the nucleic acid core of the virus is by itself infectious. The protein shell surrounding this virus apparently does not enter into the infective process.

The question was then raised whether the entire nucleic acid complement of the virus was essential for infection or whether a fragment might be infective.

The UCLA studies indicate the entire nucleic acid core must act as a unit for infection to occur.

Other aspects of the study suggested that the nucleic acid component of the virus is a highly ordered structure whose length is very close to that of the virus itself.

Science News Letter, January 5, 1957

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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**BIOCHEMICAL INDIVIDUALITY: The Basis for the Genetotrophic Concept**—Roger J. Williams—Wiley, 214 p., illus., \$5.75. Reason for writing this book, the author explains, is the need in human biology and medicine for more attention to variability and individuality at the physiological and biochemical levels.

**BREADS, WHITE AND BROWN: Their Place in Thought and Social History**—R. A. McCance and E. M. Widdowson—Lippincott, 174 p., illus., \$5.00. Starting with an investigation into the nutritive value of various kinds of dark and white bread, the authors have traced the history of the use of the "staff of life" from the times of the pyramids to 1950.

**THE CHILDREN'S ILLUSTRATED ENCYCLOPAEDIA OF GENERAL KNOWLEDGE: A Reference Book and School Companion for Boys and Girls**—F. G. W. Knowles and others—Philosophical Library, 480 p., illus., \$4.95. Having a section on nature and one on scientific data, constants and formulae.

**CONCRETE CONTROL AND CONSTRUCTION**—Glenway Maxon and others—Highway Research Board, Bulletin 132, 34 p., illus., paper, 75 cents. For those concerned with the construction of concrete highways.

**EDWARD PALMER: Plant Explorer of the American West**—Rogers McVaugh—University of Oklahoma Press, 430 p., illus., \$6.00. The nomenclature of an estimated 2,000 species of plants has been based upon specimens collected by Edward Palmer. He was the first to call attention to the destructive habits of the cotton boll weevil.

**FATIGUE IN AIRCRAFT STRUCTURES: Proceedings of the International Conference Held at Columbia University, January 30-February 1, 1956**—Alfred M. Freudenthal, Ed.—Academic, 456 p., illus., \$12.00. Discussing an increasingly critical aspect of airplane design now that so much more is expected of aircraft due to high speeds and maneuverability.

**FLEXIBLE PAVEMENT DESIGN CORRELATION STUDY**—A. C. Benkelman, Chairman—Highway Research Board, Bulletin 133, 38 p., illus., paper, 75 cents. Details on how 19 different state highway departments and other agencies, all using the same construction materials, would design pavements for a given set of conditions as to climate and traffic.

**GAS DYNAMICS**—Klaus Oswatitsch, English version by Gustav Kuerti—Academic, Applied Mathematics and Mechanics, Volume I, 610 p.,

illus., \$12.00. The emphasis is on a clear and intuitively meaningful presentation of the physical and technical problems of gas dynamics, supplemented by the consideration of some of the fundamental experimental results.

**A HITTITE CEMETERY AT GORDION**—Machteld J. Mellink—University Museum, 60 p., 30 pl., paper, \$2.50. Describing graves and the touching mementoes buried with the dead, dating back to the second millennium, over which Phrygian settlers built their houses.

**INTERNATIONAL COMMUNICATION AND POLITICAL OPINION: A Guide to the Literature**—Bruce Lannes Smith and Chitra M. Smith—Princeton University Press, prepared for the Rand Corporation by the Bureau of Social Science Research, 325 p., \$6.00. An annotated bibliography of about 2,600 carefully selected items.

**NUCLEAR REACTORS: A Basic Guide—Industrial Division, Minneapolis-Honeywell Regulator Co.**, 7 p., illus., paper, free upon request direct to publisher, Wayne and Windrim Aves., Philadelphia 44, Pa. Brief descriptions of the various types of reactors.

**SAY IT IN GREEK**—George Pappageotes—Dover, 128 p., paper, 60 cents. Modern Greek phrase book for travelers.

**TINPLATE HANDBOOK: Facts About Tinplate for Buyers and Users**—W. E. Hoare—Tin Research Institute, 3d ed., 44 p., illus., paper, free upon request direct to publisher, 492 West Sixth Ave., Columbus 1, Ohio. Contains an extensive glossary of terms used in the tinplate industry in four languages.

**THE WALT DISNEY STORY OF OUR FRIEND THE ATOM**—Heinz Haber—Simon and Schuster, 165 p., illus., \$4.95. Beautiful color pictures illustrate this story of atomic power as originally brought together for an exhibit in "Tomorrow Land" and for a motion picture. The author is a research physicist.

**YOU AND YOUR OPERATION**—Benjamin R. Reiter—Macmillan, 150 p., illus., \$3.50. An attempt to provide answers to some of the many questions that arise in the mind of a person who must consider or undergo surgery.

**YOUR WORLD AND MINE: Essays on Human Relations**—Halbert L. Dunn—Exposition Press, 94 p., \$3.00. A readable book to help you adjust to living with yourself and your associates.

Science News Letter, January 5, 1957

## ENTOMOLOGY

### Flies Survive Ten Days Without Water

► **HOUSE FLIES** can go ten days without water, but they need a food supply, such as dry cane sugar, to survive that long. Dr. Bernard Greenberg of the University of Illinois college of pharmacy reported to the American Association for the Advancement of Science meeting in New York.

He found that flies burn themselves out before they die of desiccation. Heretofore, it was thought that flies could not live without water more than 48 hours.

Science News Letter, January 5, 1957

## GEOPHYSICS

### Expert Named Director Of Antarctic Program

► **A VETERAN** of Antarctic exploration, Dr. Laurence McKinley Gould, has been appointed director of the United States Antarctic program for the International Geophysical Year, or IGY.

Dr. Gould, president of Carleton College and a distinguished geologist, was second in command of the 1928-1930 Byrd Antarctic Expedition. His appointment was announced by Dr. Detlev W. Bronk, president of the National Academy of Sciences, and Dr. Joseph Kaplan, chairman of the U. S. National Committee for the IGY.

As director of the U. S. IGY program in Antarctica, Dr. Gould will be responsible for directing scientific observations at a network of six stations: Little America, Byrd, Pole, Weddell, Knox and Adare. The Adare Station is jointly manned by New Zealand and the U. S.

Dr. Gould will also coordinate the U. S. program with those of the 11 other nations conducting research in the Antarctic during the IGY, which lasts for 18 months starting next July 1.

Science News Letter, January 5, 1957

## TECHNOLOGY

### Electronic "Brain" Writes Routine Reports

► **NOW COMPUTERS**, or electronic "brains," are writing routine scientific reports.

At the American Association for the Advancement of Science meeting in New York, a team from Monsanto Chemical Company reported how the results of routine testing of chemical compounds for specific use are fed directly into a computer that then converts the coded results into an intelligible screening report.

"Such a reporting system not only releases technical manpower for more productive work but reduces total cost of processing a large volume of routine screening reports," said the report by R. S. Gordon, J. D. Porter and W. H. Waldo, which was not presented to the meeting by the computer.

Science News Letter, January 5, 1957

## Understanding Yourself

By Dr. Ernest R. Groves

This inspirational book, now in its well-merited 8th printing, has helped thousands to live more wisely, more fully, more happily, more effectively—in the best sense, more profitably; for a thorough understanding of self is the very bedrock foundation on which to build for peace of mind and sound mental health.

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### S.O. 1177

We have outdone ourselves. We have made a sheet film that is approximately four times as fast as *Kodak Royal Pan Film* when both films are forced equally in the developer. Photography has scarcely had time in two years to adjust itself to the broader potentialities opened to it by *Royal Pan* and its roll film counterpart, *Kodak Tri-X Film*. These films had confounded 20 years of common photographic knowledge about the limits of fast film with respect to exposure time, lighting requirements, and the lens aperture requirements that determine depth of field. Now new and stronger superlatives must be found. Four times as fast as *Royal Pan*!

The new film does not have an official name yet. It is temporarily designated *Kodak Sheet Film S.O. 1177*, the "S.O." standing for the special order which your dealer places for two- to three-week delivery. Limited quantities only are being manufactured so that improvements and modifications, if any, can be effected quickly. News photographers who have tried this film out for us have reported back exposure index figures that some of our people regard as impossibly high by an order of magnitude. So we guess until there is an official determination we had better not mention a figure.

The exposure index is the parameter representing the film in the function that connects light level to the shutter and diaphragm setting on the camera. Well-meaning zealots have taken to quoting index figures as a measure of triumph over luminous insufficiency, forgetting that the index was devised as a guide to an arbitrary ideal, not a record of what you have gotten away with under certain conditions.

Still, what do you think of this shot made on *S.O. 1177* at 1/25 second, *f*/5.6 by the light of nothing more than the ordinary cigarette

lighter with which wives light their husbands' cigarettes?



### A bright, cheerful yellow

About 150 miles up the west coast from Cape Comorin, the tip of India, there stands the town of Alleppey. The farmers around Alleppey raise black peppercorns for the world's pepper shakers. As a sideline they also raise a little ginger, and each year they also set out rhizomes (underground root-like stems) of a plant known to botanists as *Curcuma longa*. From the upper side of the rhizomes leafy shoots develop, and from the lower side, roots. At harvest time the farmers dig up the new crop of



rhizomes. These are then dried and milled to a yellow flour called turmeric, which is used to color the curries of India. Back in the old days a lot of turmeric went into the staining of leather, but chemistry killed that off long ago.

Some of the rhizomes do get shipped to a factory in Rochester, N. Y., which turns out mustard to put on hot dogs and hamburgers. Americans like their mustard to be

a bright, cheerful yellow rather than its greyish-brown self. Turmeric imparts the preferred color and contributes a little flavor as well.

From the mustard people we buy modest amounts of turmeric and percolate hot acetone through it. In this simple manner we obtain sharp melting crystals of *Curcumin* (Eastman 1179), which is nothing more than 1,7-bis(4-hydroxy-3-methoxyphenol)-1,6-heptadiene-3,5-dione.

From an acidified solution containing boric acid and *Curcumin* one can obtain a red, alcohol-soluble reaction product, formed in proportion to the amount of boric acid present. There is a Ph.D. thesis in the archives of one of the midwestern universities which suggests that this red substance represents a loose combination of the borate radical with one of the two hydroxyls in *Curcumin*. At any rate, this reaction is the basis of a method for measuring boron in soils and plant tissue. We shall be pleased to send you an abstract of the method.

The big thing about *Curcumin*, however, is that it changes from yellow to red over the pH range 7.5 to 8.5 and from red to orange over the pH range 10.2 to 11.8. This gives it a place on the list of 52 *Eastman pH Indicators*.

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## Questions

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PHYSICS - What three kinds of nuclear reactions are now known? p. 5.

SURGERY - How can the appearance of scarred faces be improved? p. 7.

Photographs: Cover and p. 5, University of California; p. 3, U. S. Air Force; p. 7, Phillips Petroleum Company; p. 10, British Information Services; p. 16, Eastman Chemical Products, Inc.

## PSYCHOLOGY

### Rulers of Nations Called The Most Criminal Group

➤ RULERS, modern as well as ancient, are the most criminal group in their populations, Russian-born Prof. Pitirim A. Sorokin of Harvard University told the American Association for the Advancement of Science meeting in New York.

The rate of murderers found among rulers runs as high as one out of four or even one out of one, Prof. Sorokin reported.

Prof. Sorokin's research into the criminality of rulers included English, Russian, French, German, Austrian and Turkish monarchs, and the presidents and bosses of republics. Rulers' murders include the killing of father, mother, wife, brother and so on, he said.

Discovery of atomic energy and nuclear weapons challenge social scientists to find a way to prevent misuse of these modern advances by criminals, selfish groups, and especially by the governments of states, he pointed out.

"There is hardly any doubt," he warned, "that within one or two decades the nuclear weapons will pass into the hands of criminals. And there is no certainty that the rulers of nations would not misuse the nuclear weapons by plunging mankind into international or civil wars."

The ruling groups of today are possibly the most dangerous groups for the well-being of mankind, Prof. Sorokin warned.

Recent advances in the physical and biological sciences also call for abandonment of many theories of the social sciences as scientifically untenable. He included among the theories requiring drastic revision or abandonment the Freudian theory of personality and human behavior and the Darwinian theory of the struggle for existence.

## ENTOMOLOGY

# Communication of Insects

► DANCES, smells, food, lights and sights all play an important role in the gossip of the insect world, the American Association for the Advancement of Science meeting was told.

Recent research on the communication techniques of blow flies, honey bees and ants was discussed by a panel of scientists to illustrate how these insects tell others in their colonies of the world around them.

Food passed from ant to ant in a colony, Drs. Edward O. Wilson and Thomas Eisner of Harvard University found, may serve as an important means of letting worker ants know the nutritional status of the colony, and also about the discovery of new food sources.

Dr. Arthur C. Cole of the University of Tennessee reported that ants use sight, sound, touch, smell and internal organs to communicate with one another and that these mechanisms may vary considerably with different ants.

He said that communication between ants depends heavily on an inter-individual stimulation of these senses and, possibly, they form a collective and coordinated pattern between a group of ants.

Of all the senses of the tiny insects, Dr. Cole noted, smell and touch seem to be the most generally distributed and the most frequently used. Some ants have eyes and others are eyeless, he said. Some ants can perceive two types of acoustic vibrations, aerial and substratal.

The sense organs of smell, Dr. Cole explained, seem to be confined to the antennae and ants also produce odors "powerfully aromatic to man."

The single file march of ants that harries picnickers and homeowners can result from trail following by the ants, which sniff their way along a trail blazed by other ants depositing chemicals en route.

A clue to the origin of the highly stylized

honey bee communicative dance has been found by Dr. V. G. Dethier of the Johns Hopkins University, Baltimore, Md.

Using blow flies, Dr. Dethier found that a single fly will perform a dance when presented with a drop of sugar. It responds to the sugar "after" it is removed by making repeated clockwise and counter-clockwise turnings, which the scientist says "strikingly resembles a dance."

Thus, Dr. Dethier suggested, the honey bee dance was derived from a primitive innate behavior pattern of the sort exhibited by flies.

Science News Letter, January 5, 1957

## GENERAL SCIENCE

## Cost of Another War

► ANOTHER WORLD war could cost Americans their democratic way of life and the world its western civilization, Dr. Benjamin H. Williams of the Industrial College of the Armed Forces, Washington, warned the American Association for the Advancement of Science meeting in New York.

It is well known, Dr. Williams said, that war has had important effects on the economic and political structures of many countries.

Even in victorious and uninvaded nations, such as the United States, the changes after a world war have been more profound than many people realize.

If there is another major war, Dr. Williams said, Americans can expect greater controls imposed on them by the Federal Government. This, he explains, is necessary to mobilize for victory, but the controls cannot be expected to disappear overnight.

"Should there be another major war," Dr. Williams stated, "the consequent institutional readjustments would doubtless exceed any made in this country in the past."

However, this is not the only grave danger of a Third World War, particularly if it is a nuclear war, Dr. Williams said.

Beyond these contingencies, he said, is the ominous possibility that the human race might be destroyed or, short of that, western civilization would be imperiled and that its institutions, which have contributed so richly to human welfare, would be supplanted by others of a rising regime from outside the circle of western states, perhaps originating in Asia.

Dr. Williams offered three suggestions to avoid what he calls "these threatening possibilities":

1. The maintenance of a position of strength to avoid aggression.
2. A tremendous effort to find defenses against nuclear attacks.
3. An equally tremendous effort to establish a system of international peace.

## Do You Know?

Aircraft speeds are approaching the range in which excessive temperatures of the leading edges of wings may induce serious loss of metal by sublimation.

The New York Academy of Sciences was organized in 1817 and is the fourth oldest scientific society in the United States.

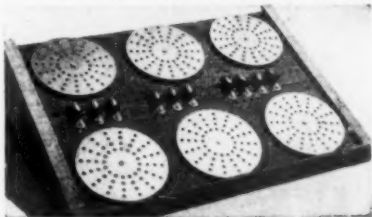
An outbreak of *erysipelas*, a disease commonly associated with pigs, was discovered in a commercial flock of pheasants.

More than 45,000,000 recreation visits were made to the national forests in 1955.

"If these processes fail," Dr. Williams cautioned, "there seems to be no reason to believe that the western world, including the United States, will have any immunity from the historic tendency toward institutional change occasioned by major war."

Science News Letter, January 5, 1957

## Can you think faster than this Machine?



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For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin B64. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

✿ **CAKE MOLD** for making party cake-houses offers fun for children and grown-ups alike. The take-apart aluminum mold can be used to bake house-shaped cakes that with a little imagination in decorating become churches, barns or schools. The molds are available in two sizes.

Science News Letter, January 5, 1957

✿ **ARMORED CAR** for junior is also a bank for junior's savings. Molded of a non-shattering acetate plastic, the money-truck is remotely-controlled for forward or reverse motion with the press of a button. Two standard flashlight batteries power the combination toy and bank.

Science News Letter, January 5, 1957

✿ **MAIL NOTIFIER** for rural type mail boxes can be spotted from inside the house. Made of aluminum, the signal can be installed on either side of the mail post box without drilling, bolting and screwing on. The bright red signal flag is designed to hang from the box.

Science News Letter, January 5, 1957

✿ **FACE GUARD** for football helmets can be attached to any of several well-known makes. Designed to add extra protection to amateur and professional alike, the guard is made of a clear butyrate plastic. Holes may be punched or drilled on either side of



the helmet for individual adjustment of the guard, which is shown in the photograph.

Science News Letter, January 5, 1957

✿ **ALUMINUM TRELLIS** doubles as a television antenna. Replacing rooftop antennas and "rabbit-ears," the outdoor device is not affected by interference from

metal products as are indoor antennas. Measuring 32 inches wide and 72 inches tall, the TV-trellis can be covered with roses or other vines.

Science News Letter, January 5, 1957

✿ **LABORATORY STOPCOCK** requires no stopcock grease. The conventional glass plug has been replaced by a precision-machined Teflon plug that is self-lubricating. Product contamination is eliminated and the stopcock will work over a wide range of temperatures.

Science News Letter, January 5, 1957

✿ **WATER REPELLENT PRESERVATIVES** for use by fishermen and boating enthusiasts are described as quick drying. One repellent, recommended as a base for marine finishes, protects wood against warping, checking, decay and termites. The other, for sails, rope, canvas and fish nets, offers protection against moisture, decay and mildew.

Science News Letter, January 5, 1957

✿ **LETTER FILE** for the top drawer is a do-it-yourself leather and metal holder. A design can be tooled onto the leather bands that decorate the wrought iron file. The file holds over 25 letters, notes, checks or other papers.

Science News Letter, January 5, 1957



## Nature Ramblings



By HORACE LOFTIN

► THERE SEEMS to be a sort of "natural law" in the animal world that the weaker creatures in general produce a greater number of young than do the strong.

For example, the prolific but defenseless cottontail rabbit, *Sylvilagus*, produces some three litters a year, with three to six young per litter. On the other hand, the great black bear gives birth to only one or two young every second year.

Why this difference? Remember that it takes a lot of rabbit dinners to make a full-grown bear, wildcat or other flesh-eater.

If the rabbits and other small creatures are to survive as a race, they must reproduce themselves in greater numbers than will be eaten by predators. We might call this the "principle of safety in numbers."

Probably the field mice, *Microtus*, and their kin are the most prolific—as well as the most eaten—mammals in the world.

### Safety in Numbers



There may be from four to nine young in each litter, and one litter follows the other in rapid succession.

One captive field mouse had 17 consecutive litters in a single year; meanwhile her offspring began to bear young. Before the end of the year, one of her daughters had produced 13 litters more.

Such a rate of reproduction points up the

fine balance of life in nature. Without this high rate, the lesser animals might not survive the onslaught of the meat-eaters. Still, without the predators there would be more of the tiny animals than the habitat could support. Starvation and disease would quickly follow.

Other factors than predation make high reproductive potential important in survival.

For example, oysters extrude eggs and sperm into the open water, and they must come together more or less by chance to produce new individuals. The "chances" are considerably increased by the fact that the oyster produces from 15,000,000 to 114,000,000 eggs at a single spawning.

Bacteria may divide to make up two separate individuals every 20 minutes, under favorable conditions.

If multiplication continued at this rate without death among the offspring, the bacteria in a glass of milk would make a mass larger than the earth in five days!

Science News Letter, January 5, 1957